The Boeing Company
Santa Susana Field Laboratory
5800 Woolsey Canyon Road
Canoga Park, CA 91304-1148

Via FedEx

January 8, 2014
In reply, refer to SHEA-114315

RECEIVED
JAN 10 2013
By

Mr. Mark Malinowski, PG
DTSC Program Manager
California Department of Toxic Substances Control
8800 Cal Center Drive
Sacramento, CA 95826-3200

Dear Mr. Malinowski:

Subject: Soil Characterization Levels for Radionuclides for the Boeing RFI Subareas, Santa Susana Field Laboratory, Ventura County, CA

Please review the enclosed Table B-6, which presents the soil characterization levels (SCLs) The Boeing Company (Boeing) proposes to use for radionuclides in the Boeing RFI subareas at the Santa Susana Field Laboratory. The basis for each SCL is included in this table. The SCLs were determined by using the greater of the background value (based on the Final Calculated All Combined Strata 95% Upper Tolerance Limit [UTL] with 95% Coverage background threshold value) and the United States Environmental Protection Agency Residential Preliminary Remediation Goal value. Boeing proposes that the enclosed Table B-6 become part of the Master RCRA Facility Investigation Data Gap Work Plan for the Santa Susana Field Laboratory (CH2M HILL, 2013).

If you have any questions regarding this submittal, please contact Mike Bower at (818) 466-8776.

I certify under penalty of law that these documents and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

David W. Dassler, P.E.
Program Director, Site Closure
Santa Susana Field Laboratory

cc: Roger Paulson, DTSC
Alexa Stamets, CH2M HILL
Dixie Hambrick, MWH

Table B-6

Soil Characterization Levels for Radionuclides

Master RCRA Facility Investigation Data Gap Work Plan, Santa Susana Field Laboratory, Ventura County, California

Analysis Group	Analyte	CAS Number	Soil Characterization Level	Unit	Basis
Radionuclide	Actinium-227	14952400	2.50E+00	pCi/g	EPA Residential PRG
Radionuclide	Actinium-228	14331830	6.79E+02	pCi/g	EPA Residential PRG
Radionuclide	Americium-241	14596102	1.80E+00	pCi/g	EPA Residential PRG
Radionuclide	Antimony-124	14683104	1.63E+00	pCi/g	EPA Residential PRG
Radionuclide	Antimony-125	14234356	4.72E-01	pCi/g	EPA Residential PRG
Radionuclide	Barium-133	13981414	1.72E-01	pCi/g	EPA Residential PRG
Radionuclide	Barium-140	14798084	8.73E+01	pCi/g	EPA Residential PRG
Radionuclide	Beryllium-7	13966024	7.56E+01	pCi/g	EPA Residential PRG
Radionuclide	Bismuth-210	14331794	4.95E+03	pCi/g	EPA Residential PRG
Radionuclide	Bismuth-211	15229375	3.02E+06	pCi/g	EPA Residential PRG
Radionuclide	Bismuth-212	14913496	2.80E+03	pCi/g	EPA Residential PRG +D
Radionuclide	Bismuth-214	14733030	7.95E+03	pCi/g	EPA Residential PRG
Radionuclide	Cerium-139	13982304	1.28E+01	pCi/g	EPA Residential PRG
Radionuclide	Cerium-141	13967743	1.09E+02	pCi/g	EPA Residential PRG
Radionuclide	Cerium-144	14762788	1.16E+01	pCi/g	EPA Residential PRG +D
Radionuclide	Cesium-134	13967709	1.63E-01	pCi/g	EPA Residential PRG
Radionuclide	Cesium-136	14234298	6.78E+00	pCi/g	EPA Residential PRG
Radionuclide	Cesium-137	10045973	1.57E-01	pCi/g	Background
Radionuclide	Chromium-51	14392020	2.39E+02	pCi/g	EPA Residential PRG
Radionuclide	Cobalt-56	14093039	6.51E-01	pCi/g	EPA Residential PRG
Radionuclide	Cobalt-57	13981505	8.09E+00	pCi/g	EPA Residential PRG
Radionuclide	Cobalt-58	13981389	2.77E+00	pCi/g	EPA Residential PRG
Radionuclide	Cobalt-60	10198400	3.89E-02	pCi/g	EPA Residential PRG
Radionuclide	Curium-242	15510733	3.20E+02	pCi/g	EPA Residential PRG
Radionuclide	Curium-243/244	15757876	3.31E-01	pCi/g	EPA Residential PRG
Radionuclide	Curium-245/246	13981152	3.91E-01	pCi/g	EPA Residential PRG
Radionuclide	Curium-248	15758335	2.34E-02	pCi/g	Background
Radionuclide	Europium-152	14683239	4.06E-02	pCi/g	EPA Residential PRG [see Note 5]
Radionuclide	Europium-154	15585101	4.79E-02	pCi/g	EPA Residential PRG [see Note 5]
Radionuclide	Europium-155	14391163	3.63E+00	pCi/g	EPA Residential PRG
Radionuclide	Iridium-192	14694690	3.15E+00	pCi/g	EPA Residential PRG
Radionuclide	Iodine-129	15046841	1.13E+00	pCi/g	Background
Radionuclide	Iron-59	14596124	3.49E+00	pCi/g	EPA Residential PRG
Radionuclide	Lead-210	14255040	1.67E+00	pCi/g	Background
Radionuclide	Lead-211	15816770	1.48E+05	pCi/g	EPA Residential PRG
Radionuclide	Lead-212	15092941	3.55E+03	pCi/g	EPA Residential PRG
Radionuclide	Lead-214	15067284	4.48E+04	pCi/g	EPA Residential PRG
Radionuclide	Manganese-54	13966319	7.26E-01	pCi/g	EPA Residential PRG
Radionuclide	Mercury-203	13982780	1.82E+01	pCi/g	EPA Residential PRG
Radionuclide	Neodymium-147	14269740	1.59E+02	pCi/g	EPA Residential PRG
Radionuclide	Neptunium-239	13968597	6.26E+02	pCi/g	EPA Residential PRG
Radionuclide	Niobium-94	14681631	1.60E-02	pCi/g	EPA Residential PRG [see Note 5]
Radionuclide	Niobium-95	13967765	7.10E+00	pCi/g	EPA Residential PRG
Radionuclide	Plutonium-238	13981163	2.95E+00	pCi/g	EPA Residential PRG
Radionuclide	Plutonium-239	15117483	2.58E+00	pCi/g	EPA Residential PRG
Radionuclide	Plutonium-239/240	15117483	2.58E+00	pCi/g	EPA Residential PRG
Radionuclide	Polonium-210	13981527	3.82E+01	pCi/g	EPA Residential PRG
Radionuclide	Polonium-214	15735678	1.20E+15	pCi/g	EPA Residential PRG
Radionuclide	Polonium-215	15706522	5.54E+13	pCi/g	EPA Residential PRG
Radionuclide	Polonium-216	15756588	6.48E+12	pCi/g	EPA Residential PRG
Radionuclide	Polonium-218	93862534	9.83E+09	pCi/g	EPA Residential PRG
Radionuclide	Potassium-40	13966002	2.60E+01	pCi/g	Background
Radionuclide	Promethium-144	14834732	3.47E-01	pCi/g	EPA Residential PRG
Radionuclide	Promethium-146	14834743	1.34E-01	pCi/g	EPA Residential PRG
Radionuclide	Protactinium-231	14331852	5.62E-01	pCi/g	Background [see Note 5]
Radionuclide	Protactinium-234m	15100284	1.36E+07	pCi/g	EPA Residential PRG
Radionuclide	Radium-223	15623457	6.46E+01	pCi/g	EPA Residential PRG +D
Radionuclide	Radium-224	13233324	2.98E+01	pCi/g	EPA Residential PRG +D

Table B-6

Soil Characterization Levels for Radionuclides

Master RCRA Facility Investigation Data Gap Work Plan, Santa Susana Field Laboratory, Ventura County, California

Analysis Group	Analyte	CAS Number	Soil Characterization Level	Unit	Basis
Radionuclide	Radium-226	13982633	1.82E+00	pCi/g	Background
Radionuclide	Radium-228	15262201	2.10E+00	pCi/g	Background
Radionuclide	Radon-219	14835020	2.71E+07	pCi/g	EPA Residential PRG +D
Radionuclide	Radon-220	22481487	7.86E+08	pCi/g	EPA Residential PRG
Radionuclide	Ruthenium-106	13967481	2.29E+00	pCi/g	EPA Residential PRG +D
Radionuclide	Silver-110m	14391765	2.54E-01	pCi/g	EPA Residential PRG
Radionuclide	Sodium-22	13966320	9.02E-02	pCi/g	EPA Residential PRG
Radionuclide	Strontium-90	10098972	2.40E-01	pCi/g	EPA Residential PRG +D
Radionuclide	Thallium-207	14133676	1.77E+07	pCi/g	EPA Residential PRG
Radionuclide	Thallium-208	14913509	2.31E+04	pCi/g	EPA Residential PRG
Radionuclide	Thorium-227	15623479	1.05E+02	pCi/g	EPA Residential PRG
Radionuclide	Thorium-228	14274829	2.34E+01	pCi/g	EPA Residential PRG
Radionuclide	Thorium-230	14269637	3.46E+00	pCi/g	EPA Residential PRG
Radionuclide	Thorium-231	14932402	2.86E+04	pCi/g	EPA Residential PRG
Radionuclide	Thorium-232	7440291	3.07E+00	pCi/g	EPA Residential PRG
Radionuclide	Thorium-234	15065108	2.80E+02	pCi/g	EPA Residential PRG +D
Radionuclide	Tin-113	13966068	3.02E+02	pCi/g	EPA Residential PRG
Radionuclide	Tritium	10028178	4.89E+00	pCi/g	Background
Radionuclide	Uranium-233/234	13966295	3.86E+00	pCi/g	EPA Residential PRG
Radionuclide	Uranium-234	13966295	4.02E+00	pCi/g	EPA Residential PRG
Radionuclide	Uranium-235	15117961	1.92E-01	pCi/g	EPA Residential PRG
Radionuclide	Uranium-235/236	15117961	1.92E-01	pCi/g	EPA Residential PRG
Radionuclide	Uranium-238	7440611	1.52E+00	pCi/g	Background
Radionuclide	Yttrium-88	13982360	5.91E-01	pCi/g	EPA Residential PRG
Radionuclide	Zinc-65	13982393	1.25E+00	pCi/g	EPA Residential PRG
Radionuclide	Zirconium-95	13967710	4.04E+00	pCi/g	EPA Residential PRG
Radionuclide	Gross alpha	Does not apply	No SCL	pCi/g	No BTV or PRG available
Radionuclide	Gross beta	Does not apply	No SCL	pCi/g	No BTV or PRG available
Radionuclide	Iodine-131	10043660	6.38E+01	pCi/g	EPA Residential PRG
Radionuclide	Strontium-89	14158271	1.30E+02	pCi/g	EPA Residential PRG
Radionuclide	Total Uranium	Does not apply	No SCL	pCi/g	No BTV or PRG available

Acronyms:

pCi/g = picocuries per gram of dry soil.

EPA = United States Environmental Protection Agency

PRG = Preliminary Remediation Goal

+D = cancer risk and dose effectiveness estimates for these radionuclides include the contributions from their short-lived decay products (i.e., "daughters"), assuming equal activity concentrations (i.e., secular equilibrium) with the principal or parent nuclide in the environment.

Notes:

1. These characterization levels apply to the Boeing RFI subareas.
2. The Soil Characterization Levels that are based on background are based on Final Calculated All Combined Strata 95% Upper Tolerance Limit (UTL) with 95% Coverage found in Appendix A of the *Final Radiological Background Study Report Santa Susana Field Laboratory Ventura County, California*, EPA October 2011. They are not based upon the 95 upper simultaneous limit (USL) values provide in the tables in the main text of that document.
3. The EPA Residential PRGs were downloaded from the EPA website http://epa-prgs.ornl.gov/radionuclides/download.html on July 18, 2013. The "+D" PRG was chosen
4. For radionuclides listed with two atomic masses, such as Uranium-245/246, the lower of the PRG or BTV of the individual radionuclides, such as Uranium-245 or Uranium-246, is used when one is not available for the combination.
5. The Soil Characterization Level is the maximum of the background or EPA Residential PRG values, even when one value is not available. Actual laboratory Minimum Detectable Concentrations (MDC) might be above the SCL shown on this table. For example, the lowest MDC achieved for the Area IV analysis in 2008 for Europium-152, Europium-154, Niobium-94, and Protactinium-231 were above the SCL shown on this table. Actual MDCs for future work are not known at this time.